

## Skeptic Arguments and What The Science Says

Skeptic Argument	vs What the Science Says
1 "It's the sun"	In the last 35 years of global warming, sun and climate have been going in opposite directions
2 "Climate's changed before"	Climate reacts to whatever forces it to change at the time; humans are now the dominant forcing.
3 "There is no consensus"	97% of climate experts agree humans are causing global warming.
4 "It's cooling"	The last decade 2000-2009 was the hottest on record.
5 "Models are unreliable"	Models successfully reproduce temperatures since 1900 globally, by land, in the air and the ocean.
6 "Temp record is unreliable"	The warming trend is the same in rural and urban areas, measured by thermometers and satellites.
7 "It hasn't warmed since 1998"	For global records, 2010 is the hottest year on record, tied with 2005.
8 "Ice age predicted in the 70s"	The vast majority of climate papers in the 1970s predicted warming.
9 "Antarctica is gaining ice"	Satellites measure Antarctica losing land ice at an accelerating rate.
10 "CO2 lags temperature"	CO2 didn't initiate warming from past ice ages but it did amplify the warming.
11 "We're heading into an ice age"	Worry about global warming impacts in the next 100 years, not an ice age in over 10,000 years.
12 "It's not bad"	Negative impacts of global warming on agriculture, health & environment far outweigh any positives.
13 "Al Gore got it wrong"	Al Gore book is quite accurate, and far more accurate than contrarian books.
14 "It's freaking cold!"	A local cold day has nothing to do with the long-term trend of increasing global temperatures.
15 "1934 - hottest year on record"	1934 was one of the hottest years in the US, not globally.
16 "It's cosmic rays"	Cosmic rays show no trend over the last 30 years & have had little impact on recent global warming.
17 "Hockey stick is broken"	Recent studies agree that recent global temperatures are unprecedented in the last 1000 years.
18 "Hurricanes aren't linked to global warming"	There is increasing evidence that hurricanes are getting stronger due to global warming.
19 "Climategate CRU emails suggest conspiracy"	Several investigations have cleared scientists of any wrongdoing in the media-hyped email incident.
20 "Sea level rise is exaggerated"	A variety of different measurements find steadily rising sea levels over the past century.
21 "Arctic icemelt is a natural cycle"	Thick arctic sea ice is undergoing a rapid retreat.
22 "It's Urban Heat Island effect"	Urban and rural regions show the same warming trend.
23 "Mars is warming"	Mars is not warming globally.
24 "Climate sensitivity is low"	Net positive feedback is confirmed by many different lines of evidence.
25 "It's a 1500 year cycle"	Ancient natural cycles are irrelevant for attributing recent global warming to humans.
26 "Human CO2 is a tiny % of CO2 emissions"	The natural cycle adds and removes CO2 to keep a balance; humans add extra CO2 without removing any.
27 "Water vapor is the most powerful greenhouse gas"	Rising CO2 increases atmospheric water vapor, which makes global warming much worse.
28 "Oceans are cooling"	The most recent ocean measurements show consistent warming.
29 "Extreme weather isn't caused by global warming"	Extreme weather events are being made more frequent and worse by global warming.
30 "CO2 effect is weak"	The strong CO2 effect has been observed by many different measurements.
31 "Greenland was green"	Other parts of the earth got colder when Greenland got warmer.
32 "Other planets are warming"	Mars and Jupiter are not warming, and anyway the sun has recently been cooling slightly.
33 "There's no empirical evidence"	There are multiple lines of direct observations that humans are causing global warming.
34 "IPCC is alarmist"	The IPCC summarizes the recent research by leading scientific experts.
35 "Glaciers are growing"	Most glaciers are retreating, posing a serious problem for millions who rely on glaciers for water.
36 "It cooled mid-century"	Mid-century cooling involved aerosols and is irrelevant for recent global warming.
37 "We're coming out of the Little Ice Age"	The sun was warming up then, but the sun hasn't been warming since 1970.
38 "Polar bear numbers are increasing"	Polar bears are in danger of extinction as well as many other species.
39 "It warmed before 1940 when CO2 was low"	Early 20th century warming is due to several causes, including rising CO2.
40 "Greenland is gaining ice"	Greenland on the whole is losing ice, as confirmed by satellite measurement.

41 "There's no correlation between CO2 and temperature"	There is long-term correlation between CO2 and global temperature; other effects are short-term.
42 "Satellites show no warming in the troposphere"	The most recent satellite data show that the earth as a whole is warming.
43 "Animals and plants can adapt to global warming"	Global warming will cause mass extinctions of species that cannot adapt on short time scales.
44 "CO2 is not a pollutant"	Excess CO2 emissions will lead to hotter conditions that will stress and even kill crops.
45 "Medieval Warm Period was warmer"	Globally averaged temperature now is higher than global temperature in medieval times.
46 "CO2 was higher in the past"	When CO2 was higher in the past, the sun was cooler.
47 "Mt. Kilimanjaro's ice loss is due to land use"	Most glaciers are in rapid retreat worldwide, notwithstanding a few complicated cases.
48 "CO2 limits will harm the economy"	Various economic estimates find the net economic impact of a price on carbon will be minor.
49 "Ocean acidification isn't serious"	Past history shows that when CO2 rises quickly, there was mass extinctions of coral reefs.
50 "There's no tropospheric hot spot"	We see a clear "short-term hot spot" - there's various evidence for a "long-term hot spot".
51 "Arctic sea ice has recovered"	Thick arctic sea ice is in rapid retreat.
52 "2009-2010 winter saw record cold spells"	A cold day in Chicago in winter has nothing to do with the trend of global warming.
53 "Scientists can't even predict weather"	Weather and climate are different; climate predictions do not need weather detail.
54 "It's the ocean"	The oceans are warming and moreover are becoming more acidic, threatening the food chain.
55 "2nd law of thermodynamics contradicts greenhouse theory"	The 2nd law of thermodynamics is consistent with the greenhouse effect which is directly observed.
56 "It's El Niño"	El Nino has no trend and so is not responsible for the trend of global warming.
57 "It's Pacific Decadal Oscillation"	The PDO shows no trend, and therefore the PDO is not responsible for the trend of global warming.
58 "Neptune is warming"	And the sun is cooling.
59 "Greenland ice sheet won't collapse"	When Greenland was 3 to 5 degrees C warmer than today, a large portion of the Ice Sheet melted.
60 "CO2 effect is saturated"	Direct measurements find that rising CO2 is trapping more heat.
61 "Jupiter is warming"	Jupiter is not warming, and anyway the sun is cooling.
62 "Volcanoes emit more CO2 than humans"	Humans emit 100 times more CO2 than volcanoes.
63 "Sea level rise predictions are exaggerated"	Sea level rise is now increasing faster than predicted due to unexpectedly rapid ice melting.
64 "Pluto is warming"	And the sun has been recently cooling.
65 "CO2 measurements are suspect"	CO2 levels are measured by hundreds of stations across the globe, all reporting the same trend.
66 "Solar Cycle Length proves its the sun"	The sun has not warmed since 1970 and so cannot be driving global warming.
67 "It's not happening"	Recent global warming is occurring and is due to humans.
68 "IPCC were wrong about Himalayan glaciers"	Glaciers are in rapid retreat worldwide, despite 1 error in 1 paragraph in a 1000 page IPCC report.
69 "CO2 has a short residence time"	Excess CO2 from human emissions has a long residence time of over 100 years
70 "It's a natural cycle"	No known natural forcing fits the fingerprints of observed warming except anthropogenic greenhouse gases.
71 "It's aerosols"	Aerosols have been masking global warming, which would be worse otherwise.
72 "500 scientists refute the consensus"	Around 97% of climate experts agree that humans are causing global warming.
73 "It's microsite influences"	Microsite influences on temperature changes are minimal; good and bad sites show the same trend.
74 "IPCC overestimate temperature rise"	Monckton used the IPCC equation in an inappropriate manner.
75 "Dropped stations introduce warming bias"	If the dropped stations had been kept, the temperature would actually be slightly higher.
76 "Humans are too insignificant to affect global climate"	Humans are small but powerful, and human CO2 emissions are causing global warming.
77 "It's not us"	Multiple sets of independent observations find a human fingerprint on climate change.

78 "Lindzen and Choi find low climate sensitivity"	Lindzen and Choi's paper is viewed as unacceptably flawed by other climate scientists.
79 "Less than half of published scientists endorse global warming"	Around 97% of climate experts agree that humans are causing global warming.
80 "Mike's Nature trick to 'hide the decline'"	Phil Jones was quoted out of context, and nothing was hidden.
81 "Greenhouse effect has been falsified"	The greenhouse effect is standard physics and confirmed by observations.
82 "Phil Jones says no global warming since 1995"	Phil Jones was misquoted.
83 "It's a climate regime shift"	There is no evidence that climate has chaotic "regimes" on a long-term basis.
84 "The science isn't settled"	That human CO2 is causing global warming is known with high certainty & confirmed by observations.
85 "It's land use"	Land use plays a minor role in climate change, although carbon sequestration may help to mitigate.
86 "Hansen's 1988 prediction was wrong"	Jim Hansen had several possible scenarios; his mid-level scenario B was right.
87 "Humidity is falling"	Multiple lines of independent evidence indicate humidity is rising and provides positive feedback.
88 "It's methane"	Methane plays a minor role in global warming but could get much worse if permafrost starts to melt.
89 "Corals are resilient to bleaching"	Globally about 1% of coral is dying out each year.
90 "Record snowfall disproves global warming"	Warming leads to increased evaporation and precipitation, which falls as increased snow in winter.
91 "Peer review process was corrupted"	An Independent Review concluded that CRU's actions were normal and didn't threaten the integrity of peer review.
92 "Global warming stopped in 1998, 1995, 2002, 2007, 2010, ????"	But global temperatures rose sharply in 2009, to the second hottest level.
93 "CO2 is not increasing"	CO2 is increasing rapidly, and is reaching levels not seen on the earth for millions of years.
94 "Freedom of Information (FOI) requests were ignored"	An independent inquiry found CRU is a small research unit with limited resources and their rigour and honesty are not in doubt.
95 "Naomi Oreskes' study on consensus was flawed"	Benny Peiser, the Oreskes critic, retracted his criticism.
96 "CO2 is coming from the ocean"	The ocean is absorbing massive amounts of CO2, and is becoming more acidic as a result.
97 "Over 31,000 scientists signed the OISM Petition Project"	The 'OISM petition' was signed by only a few climatologists.
98 "It's global brightening"	This is a complex aerosol effect with unclear temperature significance.
99 "Ice isn't melting"	Ice is melting at an accelerating rate at both poles and in glaciers all over the world.
100 "It's albedo"	Albedo change in the Arctic, due to receding ice, is increasing global warming.
101 "Earth hasn't warmed as much as expected"	This argument ignores the cooling effect of aerosols and the planet's thermal inertia.
102 "Springs aren't advancing"	Hundreds of flowers across the UK are flowering earlier now than any time in 250 years.
103 "They changed the name from global warming to climate change"	'Global warming' and 'climate change' mean different things and have both been used for decades.
104 "Ice Sheet losses are overestimated"	A number of independent measurements find extensive ice loss from Antarctica and Greenland.
105 "IPCC were wrong about Amazon rainforests"	The IPCC statement on Amazon rainforests was correct, and was incorrectly reported in some media.
106 "It's too hard"	Scientific studies have determined that current technology is sufficient to reduce greenhouse gas emissions enough to avoid dangerous climate change.
107 "Arctic sea ice loss is matched by Antarctic sea ice gain"	Arctic sea ice loss is three times greater than Antarctic sea ice gain.
108 "Solar cycles cause global warming"	Over recent decades, the sun has been slightly cooling & is irrelevant to recent global warming.
109 "CO2 is not the only driver of climate"	CO2 is the main driver of climate change.
110 "The IPCC consensus is phoney"	Ironically, it's those who are mispresenting Hulme's paper that are the ones being misleading.
111 "Most of the last 10,000 years were warmer"	This argument uses regional temperature data that ends in 1855, long before modern global warming began.
112 "Tree-rings diverge from temperature after 1960"	This is a detail that is complex, local, and irrelevant to the observed global warming trend.

113 "Climate is chaotic and cannot be predicted"	Weather is chaotic but climate is driven by Earth's energy imbalance, which is more predictable.
114 "The sun is getting hotter"	The sun has just had the deepest solar minimum in 100 years.
115 "Trenberth can't account for the lack of warming"	Trenberth is talking about the details of energy flow, not whether global warming is happening.
116 "A drop in volcanic activity caused warming"	Volcanoes have had no warming effect in recent global warming - if anything, a cooling effect.
117 "Mauna Loa is a volcano"	The global trend is calculated from hundreds of CO2 measuring stations and confirmed by satellites.
118 "It's waste heat"	Greenhouse warming is adding 100 times more heat to the climate than waste heat.
119 "Breathing contributes to CO2 buildup"	By breathing out, we are simply returning to the air the same CO2 that was there to begin with.
120 "It warmed just as fast in 1860-1880 and 1910-1940"	The warming trend over 1970 to 2001 is greater than warming from both 1860 to 1880 and 1910 to 1940.
121 "Water levels correlate with sunspots"	This detail is irrelevant to the observation of global warming caused by humans.
122 "CO2 emissions do not correlate with CO2 concentration"	That humans are causing the rise in atmospheric CO2 is confirmed by multiple isotopic analyses.
123 "Renewables can't provide baseload power"	A combination of different renewables can provide long-term baseload.
124 "Water vapor in the stratosphere stopped global warming"	This possibility just means that future global warming could be even worse.
125 "Southern sea ice is increasing"	Antarctic sea ice has grown in recent decades despite the Southern Ocean warming at the same time.
126 "Warming causes CO2 rise"	Recent warming is due to rising CO2.
127 "It's ozone"	Ozone has only a small effect.
128 "Scientists retracted claim that sea levels are rising"	The Siddall 2009 paper was retracted because its predicted sea level rise was too low.
129 "CO2 was higher in the late Ordovician"	The sun was much cooler during the Ordovician.
130 "Antarctica is too cold to lose ice"	Glaciers are sliding faster into the ocean because ice shelves are thinning due to warming oceans.
131 "DMI show cooling Arctic"	While summer maximums have showed little trend, the annual average Arctic temperature has risen sharply in recent decades.
132 "Record high snow cover was set in winter 2008/2009"	Winter snow cover in 2008/2009 was average while the long-term trend in spring, summer, and annual snow cover is rapid decline.
133 "It's CFCs"	CFCs contribute at a small level.
134 "Melting ice isn't warming the Arctic"	Melting ice leads to more sunlight being absorbed by water, thus heating the Arctic.
135 "Greenland has only lost a tiny fraction of its ice mass"	Greenland's ice loss is accelerating & will add metres of sea level rise in upcoming centuries.
136 "Positive feedback means runaway warming"	Positive feedback won't lead to runaway warming; diminishing returns on feedback cycles limit the amplification.
137 "An exponential increase in CO2 will result in a linear increase in temperature"	CO2 levels are rising so fast that unless we decrease emissions, global warming will accelerate this century.
138 "Satellite error inflated Great Lakes temperatures"	Temperature errors in the Great Lakes region are not used in any global temperature records.
139 "It's satellite microwave transmissions"	Satellite transmissions are extremely small and irrelevant.
140 "Royal Society embraces skepticism"	The Royal Society still strongly state that human activity is the dominant cause of global warming.
141 "It's only a few degrees"	A few degrees of global warming has a huge impact on ice sheets, sea levels and other aspects of climate.
142 "Skeptics were kept out of the IPCC?"	Official records, Editors and emails suggest CRU scientists acted in the spirit if not the letter of IPCC rules.
143 "Clouds provide negative feedback"	Evidence is building that net cloud feedback is likely positive and unlikely to be strongly negative.
144 "Soares finds lack of correlation between CO2 and temperature"	Soares looks at short-term trends which are swamped by natural variations while ignoring the long-term correlation.
145 "We didn't have global warming during the Industrial Revolution"	CO2 emissions were much smaller 100 years ago.
146 "CO2 only causes 35% of global warming"	On top of CO2 warming, other pollutants such as methane and black carbon cause additional warming 65% as much as CO2.
147 "CRU tampered with temperature data"	An independent inquiry went back to primary data sources and were able to replicate CRU's results.
148 "We're heading into cooling"	There is no scientific basis for claims that the planet will begin to cool in the near future.